

CLAIMS

1. A method of adjusting a property of a SAW device using a gas cluster ion beam comprising:
 - a. providing a substrate containing at least one SAW device;
 - b. opening a beam gate to allow the gas cluster ion beam to pass there through in the direction of the at least one SAW device;
 - c. exposing an area on the at least one SAW device to a dose of ions from the gas cluster ion beam; and
 - d. closing said beam gate when the dose is delivered.
2. The method of claim 1 wherein the area comprises an entire SAW device.
3. The method of claim 1 wherein the area encompasses a plurality of SAW devices.
4. The method of claim 1 further comprising repeating steps b through e.
5. The method of claim 4 wherein the dose varies during each exposing step.
6. The method of claim 4 wherein the area varies during each exposing step.
7. The method of claim 4 further comprising moving the substrate before repeating steps b through e.
8. The method of claim 7 wherein the moving step is programmably operated.
9. The method of claim 7 wherein the moving step is accomplished in a step-wise motion.
10. The method of claim 1 wherein the exposing step comprises utilizing a portion of the gas cluster ion beam.
11. The method of claim 10 wherein the area comprises an entire SAW device.

12. The method of claim 10 wherein the area encompasses a plurality of a SAW devices.
13. The method of claim 10 further comprising repeating steps b through e.
14. The method of claim 13 wherein the dose varies during each exposing step.
15. The method of claim 13 wherein the area varies during each exposing step.
16. The method of claim 13 further comprising moving the substrate before repeating steps b through e.
17. The method of claim 16 wherein the moving step is programmably operated.
18. The method of claim 16 wherein the moving step is accomplished in a step-wise motion.
19. The method of claim 16 wherein the gas cluster ion beam is not scanned.
20. The method of claim 1 wherein the property is the characteristic frequency of the SAW device.
21. The method of claim 1 wherein the property is adjusted by removing material from the at least one SAW device.
22. The method of claim 1 wherein the property is adjusted by adding material to the at least one SAW device.
23. A gas cluster ion beam processing system comprising:
 - a source for producing a gas cluster ion beam;
 - a beam gate disposed in the path of said gas cluster ion beam, said beam gate having an open state and a closed state, wherein said open state allows said gas cluster ion beam to pass through said beam gate and irradiate a substrate and said closed state prohibits said gas cluster ion beam to pass through said beam gate;
 - a gate controller that operably controls said open state and said closed state in said beam gate; and

a beam defining means having an aperture disposed in the path of said gas cluster ion beam which defines an area on said substrate that is to be exposed to said gas cluster ion beam.

24. The processing system of claim 23 further comprising a means for moving said substrate.
25. The processing system of claim 24 wherein said moving means is programmably operated.
26. The processing system of claim 24 wherein a portion of said moving means is utilized as a current collection device.
27. The processing system of claim 24 wherein said moving means comprises a stage and a step controller.
28. The processing system of claim 23 wherein said beam defining aperture is adjustable.
29. The processing system of claim 23 further comprising means for selectably admitting a plurality of gases to said source.
30. The processing system of claim 23 wherein the beam defining means further comprising a dosimetry aperture located adjacent to said aperture that permits transmission of a dosimetry sample into a current collection device.
31. The processing system of claim 23 wherein said gate controller is programmably operated.
32. The processing system of claim 31 wherein said programmable operation is based upon a dose of ions being delivered.
33. The processing system of claim 32 wherein the dose delivered is adjustable.
34. The processing system of claim 23 wherein said substrate contains at least one SAW device.

TECHNOLOGY